

In re Patent Application of:

**ENGLAND**

Serial No. **09/825,132**

Filing Date: **APRIL 2, 2001**

**In the Claims:**

1. (Currently Amended) An antenna system comprising:

a plurality of antennas having a prescribed multidimensional spatial relationship with respect to one another;

a plurality of carrier demodulators respectively coupled to receive downconverted signals representative of outputs of said plurality of ~~said~~ antennas, and being operative to output baseband, carrier-demodulated signals;

a signal processor which is operative to process a combination of said baseband, carrier-demodulated signals to derive baseband information signals contained therein; and wherein

operation of each of said plurality of carrier demodulators is controlled in accordance with said baseband information signals derived by said signal processor, and wherein

each of said carrier demodulators is operative to regenerate a coherent carrier reference signal for demodulating said down converted signal from each of said plurality of antennas, and is operative to convert a carrier-demodulated signal to soft decision information signals, and wherein

said signal processor is operative to combine said soft decision information signals to produce a composite baseband signal, and to process said composite baseband signal to derive baseband decision information signals, which are fed back to control the internal operation of each of said plurality of carrier demodulators.

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2. (Currently Amended) An antenna system according to claim 1, wherein said plurality of antennas ~~comprise~~ comprises a plurality of spaced apart, phased array antenna panels.

3. (Currently Amended) An antenna system according to claim 1, wherein ~~a respective carrier demodulator is operative to regenerate a coherent carrier reference signal for demodulating a respective downconverted antenna output signal, and~~ each of said carrier demodulators includes a matched filter detector that converts ~~the resulting~~ said carrier-demodulated signal to soft decision information signals., ~~and wherein said signal processor operative to combine said soft decision information signals to produce a composite baseband signal, and to process said composite baseband signal to derive baseband decision information signals.~~

4. (Currently Amended) An antenna system according to claim 3, wherein operation of carrier recovery loops of said plurality of carrier demodulators is controlled in accordance with said baseband decision information signals.

5. (Currently Amended) An antenna system according to claim 1, wherein ~~a respective carrier demodulator~~ each of said plurality of carrier demodulators is configured to weight baseband, carrier-demodulated signals in accordance with a weighting control signal representative of prescribed signal-to-noise ratio information associated with a signal incident upon said plurality of antennas.

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6. (Currently Amended) An antenna system according to claim 5, wherein said weighting control signal is derived in accordance with the angle of incidence of said signal upon ~~the~~ and antenna whose downconverted output is coupled to said respective carrier demodulator.

7. (Currently Amended) An antenna system according to claim 4, wherein the operation of the carrier recovery ~~loop~~ loops of said ~~respective~~ plurality of carrier ~~demodulator~~ demodulators is weighted in accordance with a weighting control signal representative of prescribed signal-to-noise ratio information associated with a signal incident upon said plurality of antennas.

8. (Currently Amended) A signal processing system for processing signals derived from a plurality of generally panel-configured phased array antennas having a prescribed multidimensional spatial relationship with respect to one another comprising:

a plurality of carrier demodulators respectively coupled to process signals representative of signal outputs of said plurality of ~~said~~ generally panel-configured phased array antennas, so as to output baseband, carrier-demodulated signals;

a baseband signal processor which is operative to process a combination of said baseband, carrier-demodulated signals to derive baseband information signals contained therein; and wherein

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operation of a plurality of carrier recovery loops of said carrier demodulators is controlled in accordance with said baseband information signals, and wherein

a respective carrier demodulator is operative to regenerate a coherent carrier reference signal for demodulating said downconverted signal from each of said plurality of generally panel-configured phased array antennas, and is operative to convert a carrier-demodulated signal into soft decision information signals, and wherein

said baseband signal processor is operative to combine said soft decision information signals to produce a composite baseband signal, and to process said composite baseband signal to derive baseband decision information signals, and wherein,

said baseband decision information signals are fed back to control the internal operation of each of said plurality of carrier demodulators.

9. (Currently Amended) A signal processing system according to claim 8, wherein a respective carrier demodulator ~~is operative to regenerate a coherent carrier reference signal for demodulating a respective downconverted antenna output signal, and includes a matched filter detector that converts the resulting~~ said carrier-demodulated signal into soft decision information signals., ~~and wherein said baseband signal processor operative to combine said soft decision information signals to produce a composite baseband signal, and to process said composite baseband signal to derive baseband decision information signals.~~

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10. (Currently Amended) A signal processing system according to claim 9, wherein a respective carrier demodulator is configured to weight baseband, carrier-demodulated signals in accordance with prescribed signal-to-noise ratio information associated with a signal incident upon said plurality of generally panel-configured phased array antennas.

11. (Currently Amended) A signal processing system according to claim 10, wherein said respective carrier demodulator is configured to weight baseband, carrier-demodulated signals in accordance with the angle of incidence of said signal upon ~~the~~ a generally panel-configured phased array antenna whose downconverted output is coupled to said respective carrier demodulator.

12. (Currently Amended) A signal processing system according to claim 9, wherein the operation of the carrier recovery loop of said respective carrier demodulator is weighted in accordance with a prescribed signal-to-noise ratio information associated with a signal incident upon said plurality of generally panel-configured phased array antennas.

13. (Currently Amended) A method of deriving information from a signal comprising the steps of:

(a) arranging a plurality of antennas capable of receiving said signal incident thereon in accordance with a prescribed multidimensional spatial relationship;

(b) downconverting outputs of said plurality of antennas to produce a plurality of intermediate frequency (IF) signals

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representative of said signal incident upon said plurality of  
antennas;

(c) performing carrier demodulation of said IF signals  
to derive baseband, carrier-demodulated signals;

(d) processing a combination of said baseband, carrier-  
demodulated signals to derive baseband information signals  
contained therein; and

(e) controlling said carrier demodulation of step (c) in  
accordance with said baseband information signals derived in  
step (d), and wherein

step (c) comprises regenerating a coherent carrier  
reference signal for demodulating said downconverted  
signal from each of said plurality of antennas through a  
carrier recovery loop and processing a carrier-  
demodulated signal to obtain soft decision information  
signals and wherein

step (d) comprises combining said soft decision  
information signals associated with respect ones of said  
plurality of antennas to produce a composite baseband  
signal, and processing said baseband signal to derive  
said baseband decision information signals, and feeding  
back said baseband decision information signals to step  
(c) to control the performing of carrier demodulation of  
said IF signals to derive said baseband, carrier-  
demodulated signals.

14. (Original) A method according to claim 13, wherein  
said antennas comprise spaced apart, phased array antenna  
panels.

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15. (Currently Amended) A method according to claim 13, wherein step (c) comprises ~~regenerating a coherent carrier reference signal for demodulating a respective downconverted antenna output signal through a carrier recovery loop, and~~ processing a carrier-demodulated signal by means of a matched filter to obtain [a]said soft decision information signals. ~~signal, and wherein step (d) comprises combining soft decision information signals associated with respective ones of said plurality of antennas to produce a composite baseband signal, and processing said composite baseband signal to derive baseband decision information signals.~~

16. (Original) A method according to claim 15, wherein step (e) comprises controlling operation of carrier recovery loops in accordance with said baseband decision information signals.

17. (Currently Amended) A method according to claim 13, wherein step (c) further includes weighting said baseband, carrier-demodulated signals in accordance with prescribed signal-to-noise ratio information associated with [a]said signal incident upon said plurality of antennas.

18. (Original) A method system according to claim 17, wherein said prescribed signal-to-noise ratio information is derived in accordance with the angle of incidence of said signal upon a selected antenna.

19. (Currently Amended) A method according to claim 16, wherein step (c) comprises controlling the operation of the

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carrier loops of said plurality of carrier demodulators  
~~recovery loop of said respective carrier demodulator~~ in  
accordance with prescribed signal-to-noise ratio information  
associated with [a]said signal incident upon said plurality of  
antennas.